LEARNING BRIEF

Nutrition Sensitive Agriculture

JUNE 2019

This brief discusses the nutrition sensitive agriculture component of the USAID *Projet Nutrition et Hygiène* USAID/PNH) in Sikasso, Mali. To increase production and access to nutrient rich foods, USAID/PNH supported women in 200 communities in Sikasso and Bougouni districts to adopt sustainable and nutrition-sensitive farming practices.

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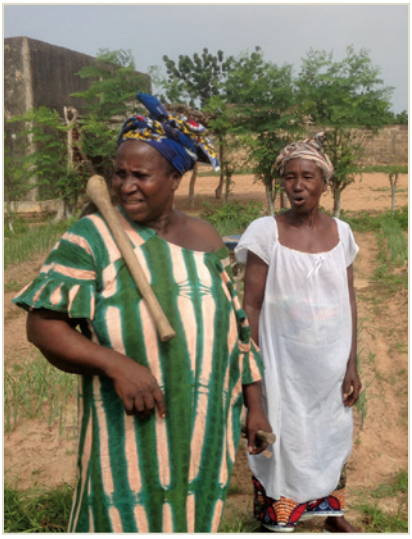
Farmer with her harvest of nutritious foods.



Farmers working in their community garden.

The Sikasso Region is considered the breadbasket of Mali, yet the population has a high rate of malnutrition. USAID/PNH, an integrated program, supports communities to improve practices in three sectors—agriculture; nutrition; and water, sanitation and hygiene (WASH)— to reduce malnutrition and improve health among pregnant and lactating women and children under age 5, especially those children under age 2. The agriculture component helps families to understand and embrace the need for adequate nutrition and to adopt sustainable and nutrition-sensitive farming practices, focusing on 2,000 women farmers and 1,000 family farms.

Focus on Nutrition

Not all agricultural products have the same nutritional value. In poor communities, families often focus on filling bellies (keeping hunger away) rather than nutrient content. In the Sikasso Region, many families grow cereal crops such as rice, millet or maize that provide calories but relatively few nutrients. USAID/PNH introduced the importance of nutrition to target communities. The project encouraged women producers to grow legumes (groundnuts, soybeans, and cowpeas) because of their nutritional value. Further, the project highlighted the importance of vegetable gardening to increase diversity in family diets and supported farmers to use organic fertilizers that improve soil structure and nutrients and are renewable, sustainable, and environmentally friendly and to avoid using chemical pesticides that can seep into the produce and compromise health.

USAID/PNH promoted a range of different nutritious crops such as orange-fleshed sweet potatoes and soybeans. While these are not necessarily new to Mali, farmers in Sikasso did not generally choose to plant these crops. The project's emphasis on nutrient-rich agriculture popularized these crops especially among the targeted women farmers. The project also highlighted the nutritional value of moringa and baobab leaves. USAID/PNH established nutrition banks that helped farmers maintain a steady source of green produce.

In addition to promoting nutritious crops, the project worked closely with women farmers, husbands, and local leaders to encourage families to retain a portion of the harvest to feed the family rather than sell everything in the market. The project trained women farmers on the nutrient content of various agricultural products as well as key

A farm field school meeting in Dendiéla Village.

nutrition behaviors such as early initiation of and exclusive breastfeeding, complementary feeding for young children and dietary diversity.

Key activities

Strengthening female producers (women farmers)

The project used a cascade training model to strengthen women farmers. USAID/PNH hired two local organizations that trained agriculture extension agents (AEA) known for their technical skills in promoting successful agricultural techniques for legume production. A core group of peer farmers, identified for their expertise in farming methods, served as mentors for 10 women farmers in their village. The AEA trained groups of peer farmers in new agricultural techniques and in nutrition-sensitive agriculture. These peer farmers in turn trained 10 women farmers interested in learning these new techniques. This cascade training was supplemented by individual visits to peer farmers and women farmers who needed to solve specific challenges or required additional support to flourish.

Farm field schools

Working with local leaders to obtain a plot of land, the project established farm field schools to serve as a practical training laboratory for women farmers from that village and three to four surrounding villages. The peer farmer from the village manages this field; s/he and the other peer farmers from the neighboring villages introduced new farming techniques, discussed nutrition and offered the 40–50 women farmers the opportunity to practice the new techniques they had learned in theory from their peer farmer. Initially the project supported transportation costs for women and peer farmers to attend the farm field schools. After the third year, transportation reimbursement ended which sharply reduced attendance.

Women learned a range of new techniques to improve the yield of their crops including plowing their fields so they were perpendicular to the slope, which allows the rain to penetrate the soil deeply and keeps the roots watered and planting their crops in optimal

Key Capacity Building Topics

- Nutrient content of different crops
- *Planting:* choosing seeds, soil types, plowing, sowing
- *Maintenance*: hoeing, weed control
- *Harvesting:* recognizing maturity, improved techniques
- *Transportation and storage methods:* turning crops into infant flour

Perimeter boundary of Banantoumou's community garden.

Community garden in Guérékélé village.

planting pockets (30 cm for groundnuts and 50 cm for cowpeas). Peer farmers also emphasized respecting the agricultural calendar noted in their farming booklet. This says that the farmer should plant the soybeans in the first week of July and cowpeas in the second week of July. They also emphasized crop maintenance and weeding to assure optimal growth.

Family farm marketing system

Family farm marketing system is an innovative system to help farmers determine how many hectares to plow by calculating how many kilograms the family needs for itself and how many kilograms of produce to sell. This participatory agricultural extension method uses simplified tools to implement activities and allows farmer-to-farmer exchanges. The approach makes decision-making tools available to family farms, improves technical understanding and analysis of the plan and the harvest projections. In a broader context, farmers can uses the process to share experiences, and agriculture extension agents can help the farmers monitor and support evidence-based decisions that improve output.

Seed project production

A key component of successful agriculture is planting good quality seeds that are suitable for the land under cultivation. The project found that women farmers often did not have access to high quality seeds at an affordable price. With limited purchasing power, women often had to travel long distances to find good quality seeds or plant inferior seeds.

The project addressed this problem by working with women to become seed producers so they could provide high quality seeds to their neighbors at a reasonable cost. First the AEA highlighted the importance of quality seeds to produce more and better legume and vegetable crops. The AEA trained the women and a few men who volunteered

"My name is Mariam Doumbia. I learned from USAID/PNH about the dangers of chemical products from the peer farmer in my village. My husband helped me dig a compost pit next to my field so I don't have trouble transporting organic fertilizer. What I found when I switched to only using organic fertilizer and insecticides is that my vegetables tasted better and my legume fields were much more productive. Now I grow enough food to meet the needs of my family and I have even started a small business."

to grow agricultural seeds. The AEA carefully monitors the fields during the growing season to ensure that the seeds produced will be high quality. In the normal situation, the government office in charge of regional agriculture is in charge of the seed production. They have appropriate agricultural technicians in charge of seed production to certify the seeds. USAID/PNH focused on producing locally acceptable seeds with the support of the AEA rather than certifying seeds. Although soya seeds failed because of poor rains in the prior two growing seasons, soya seeds producers are motivated to overcome this initial setback.

Processing

USAID/PNH was not designed as an agriculture project that could provide machinery and capital improvements to producers. Thus the project did not focus on establishing processing plants within the communities. However, the project did identify non-mechanical approaches to preserving the crops so they could be stored and used at a much later date. This included drying sweet potatoes and soy beans and grinding them into flour that could be used for infant and young child feeding. This allows the crops to last much longer than fresh produce. Villagers reported to the project that processed flours can last up to four months. Because these crops mature at different times of the year, families can use these products for at least eight months.

Preserving crops, by drying sweet potatoes and soy beans and grinding them into flour, means families have the products for a longer period to feed their infants and young children.

Food Banks

Food banks are an innovation the project introduced to Sikasso. They are an easy way to have green, fresh, nutrient-rich leaves throughout the year. The project introduced techniques that allowed community garden farmers to plant baobab or moringa seeds with small spaces in between that allow seedlings to propagate year round. To achieve success, the food bank has to ensure a constant water and manure supply and keep seedlings to one meter above ground. This process operates as a bank where a customer can withdraw "money"—in this case leafy greens—all year long. USAID/PNH has established four food banks, and is encouraging villages with community gardens to plant these around the perimeters of these gardens.

VSLA meeting in Bougouni.

Village savings and loan associations

After identifying and strengthening women farmers, the project sought to create collectives to improve sustainability and to foster cooperation and self-help. Women often save through unstructured savings groups (tontine). While not new to Mali, USAID/PNH introduced the village savings and loan association (VSLA) approach to the Sikasso Region. Interested women farmers in the village decided to start an affinity group around nutrient-sensitive agriculture and then learned more about creating a group-led credit savings business. Once approved, the AEA and the VSLA members establish the group guidelines and operating mechanisms that include a constitutive general assembly that defines rules, regulations, participation, and sanctions, a management committee to operationalize these regulations, and finally the supervisory committee to manage the process. The group meets weekly and collects contributions from each member based on the village context and purchasing power of the group members. (The VSLA Learning Brief describes this process in detail.)

Women farmers also benefit from participating in a VSLA because it gives them access to government resources. USAID/PNH has helped VSLA leaders formalize the structure, which gives its farmer members access to organic fertilizer (Tilemsi Natural Phosphate), high quality seed stock, and invitations to participate in local or regional training and learning events.

Mayor Helps Form Union for Farmers

When the mayor of Tchiémala Banimonotié Commune learned that neighboring communes had established a legume producers' union to assist women farmers he decided to start one too. With USAID/PNH's help, he gathered the necessary paperwork and is now bringing this effort to his commune. He sees it as an important step in helping his constituents to access necessary resources to help improve their lives.

Community Engagement

The agricultural component and the women farmers were integral in improving access to locally-grown nutritious food products in target villages. As part of the project's nutrition component, neighborhood groups led by maman leaders organize nutrition demonstrations in their villages to teach mothers how to feed their children.

Nutrition demonstrations (contributions of women producers)

Women farmers are instrumental in contributing to the cooking demonstrations organized at the health facility (CSCOM) and in communities. While initially the project required women to contribute produce to nutrition demonstrations, poor harvests made

Farmer Mariam Diarra from Farakala village, also a agricultural committee member, increased her soybean production 600 percent between 2015 and 2017 from 450 kg/hectare to 2,375 kg/hectare.

this difficult in the project's early years. However, currently, any woman farmer who has an acceptable crop of groundnuts, cowpeas or soy is required to donate 5 percent of her harvest to community nutrition demonstrations. These activities offer village women new recipes using these locally-grown nutritious products. Women in the community use these same agricultural products to improve the nutrition of their families, especially their children. This process increases demand for these nutritious produce as well.

Village coordination committee — agriculture subcommittee

The project established a village coordination committee (VCC) that oversees the different activities in the village related to improving nutrition among women and children. Each VCC has sub-committees focused on the project's key areas of engagement. The agriculture subcommittee helps to promote synergy among agricultural activities and other project components, including behavior change. The agriculture committee collects the 5 percent legume contribution from the 10 women farmers and gives it to the head of the nutrition committee.

Results

Working in 200 villages, the project trained peer farmers who in turn trained 2,000 women to improve their farming techniques and to focus on nutrient-rich agricultural products. The project facilitated the creation of 72 VSLAs that support about 4,320 women to save and gain access to credit to start small income-generating activities, purchase high quality seeds and organic fertilizer and pay for health services or school fees as needed. Of these VSLAs, 46 have formed into 6 larger unions to help women access even greater collective benefits.

USAID/PNH introduced a range of innovative techniques that have increased production yields or revolutionized existing practices. Using only organic fertilizers and insecticides, women farmers are now growing nutrient-rich produce to feed their families—products such as soybeans, peanuts, and cowpeas were grown but not eaten by household. Moringa and baobab were common food products in the past but were considered old

Key Results

- 2,000 trained women farmers in 200 communities
- 72 VSLAs; of these, 46 have formed into 6 formalized unions
- 36 community gardens created
- 40% of women increased produce yields by up to 25%
- 25% of women increased produce yields by 50% or more
- Over 10 new recipes developed using nutrient-rich products

Learning a new recipe. USAID/PNH developed at least ten new recipes using nutrient-rich products such as soy beans, moringa and orange-fleshed sweet potatoes.

fashioned. The project reintroduced these nutritious plants in the form of food banks around the perimeter of fields so families can eat green leaves throughout the year. Joint supervision visits in 13 villages conducted in 2019 observed that moringa cultivation and consumption increased by 25 percent since 2014.

The project introduced the highly nutritious orange-fleshed sweet potato variety which has caught on in the Sikasso and at least 15 women farmers in three villages surveyed (Tchéourala Wayéré, Guérékélé and Mpiakala) plant this variety of sweet potato on 25 percent of the land reserved for potato consumption. The desirable taste and high nutrition value commands a price almost double (1.75 times) that of ordinary potatoes. Its culture is expanding across the project area.

During joint supervision visits in 2019, the project conducted an informal survey of households in some villages and found that people are eating a more diverse diet staggered over several months of the year thanks to the uptake of the newly popularized products. Households reported eating the harvested fresh products such as orange fleshed sweet potatoes as well as finding ways to conserve these products so they can be eaten over the longer time albeit in small quantities. Families that in the past sold the entire peanut and cowpea crop, now keep a portion of the harvest for family consumption. These findings are supported by the inter-village exchange visits that were conducted in March 2019.

To develop a harmonized indicator on increasing productivity, USAID/PNH conducted a small survey with a sample size of 30 women from 10 randomly selected villages to determine whether crop yields have increased. The findings from this survey indicated

The population of M'Piakala has remarked that the children and women who regularly eat moringa leaves have improved nutritional status.

that: three-quarters of those surveyed increased their legume production by at least 5–10 percent; over half the women (52%) by 11–15 percent; 40 percent by 16 to 25 percent and one quarter by more than 50 percent. The project has also documented some outliers such as Mariam Diarra from Farakala village who increased her soybean production 600 percent between 2015 and 2017 from 450 kg/hectare to 2,375 kg/hectare.

Lessons Learned

Nutrition-sensitive agriculture can be popularized. The quality of the family food has improved with the introduction of orange sweet potato; In January 2017, the project documented that orange sweet potato production had increased only one year after being introduced. From 286 families who received the stocks of this variety of sweet potatoes in August 2016 for planting, the project reached 392 families in August 2017. Community members find that orange flesh sweet potatoes taste better than regular potatoes and therefore eat it more often. Households prepare it for breakfast or dinner to the delight of the youngest family members.

Moringa and baobab food banks have become popular in many communities. In M'Piakala, moringa and baobab food banks have spurred friendly competitions with households vying to contribute. Beyond eating fresh moringa and baobab leaves in sauces, producers have learned to make a nutritious powder from the dried leaves. This enables households to add nutritious moringa powder to sauces and cereals long after the harvest. The population of M'Piakala has remarked that the children and women who regularly eat moringa leaves have improved nutritional status.

Small investments improve participation. For the first two years, the project reimbursed women farmers for the travel costs to visit the farm field schools that were in a neighboring village. In the third year, these payments were phased out on the assumption that women would continue to see the value of the farm field schools and would bear the cost for participating. This assumption did not prove true. In future iterations, the project recommends continuing the relatively small investment in travel

Promoting Orange Flesh Sweet Potatoes

To ensure a complete production cycle, the peer farmer, Mr. Doumbia, grew all the slip sprouts provided to his village (Guérékélé) because it was late to teach the women how to do it. After harvesting the slip sprouts he shared them with all the women of his village who planted orange flesh sweet potatoes in their own garden sites. Women in Guérékélé used these cuttings to grow sweet potatoes in 2017. Approximately 70 percent of these women were able to harvest and keep cuttings for the next planting season, while 30 percent faced problems with a poor growing season and dry wells that limited their ability to harvest cuttings.

A group of community producers being trained.

costs to ensure that women are able to participate as long as possible to improve sustainability. These women live on small margins and donating their time as well as cash to cover transportation proved too much to support continued participation.

For many years, women grew soy beans (shown above) without knowing how to incorporate it into their diets. Recently, USAID/PNH has helped people reimagine how to use these products.

Organic agricultural practices increase crop yields and improve flavor. Analyzing the family farm notebooks kept by women farmers, the women who adopted the new practices promoted by the project—planting high quality seeds, adjusting spacing between plants, using organic fertilizer and composting raw materials—found that from 2014 to 2017 their crop yields of groundnuts, soybeans and cowpeas increased from 50 percent to 200 percent when rainfall was adequate. One farmer even documented a 2,000 percent increase in soybean harvest and a 400 percent increase in groundnut harvests in four years.

Women found that the taste of cowpeas improved when commercial fertilizers were not used. Further, cowpeas could be stored longer when grown organically. The project found that prepared cowpeas grown organically last up to 24 hours, approximately 18 hours longer than when grown with commercial fertilizer. Market garden products (tomatoes, peppers, eggplant, lettuce, etc.) can also be stored longer without spoiling and they taste better.

Use is as important as knowledge and motivates improved practices. The project started by introducing the importance of eating nutrient rich produce to improve nutrition in pregnant women and young children. Then USAID/PNH introduced soy cultivation, but did not focus on how to use the product. So for many years, women grew soy beans without knowing how to incorporate it into their diets. Recently, USAID/PNH has helped people reimagine how to use these products. Village women have been empowered to develop new and innovative recipes using these locally-available foodstuffs.

Transforming many products (e.g. soy, peanuts, moringa, sweet potatoes) into infant flour has helped women store these products for longer periods so they their children can eat nutritious meals throughout the year. Several communities have reported that soy flour last for 2–4 months and orange flesh sweet potatoes when dried and grated can last for up to 2–3 months. This has motivated women to expand their yields. Further, they have learned how to cultivate their fields at the correct time to maximize their yields.

A peer farmer in the community garden.

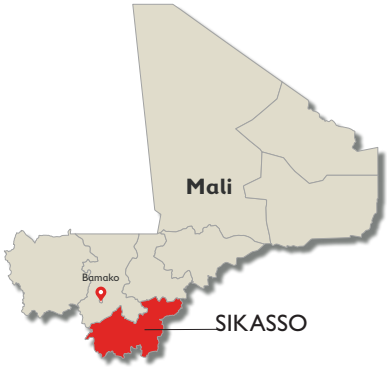
Conclusion

Although Sikasso Region is the breadbasket of Mali with good rainfall and high quality agricultural land, the people suffer from high rates of acute malnutrition. With a nutrition-sensitive agriculture approach to complement efforts to change nutrition and hygiene practices at the community level, USAID/PNH introduced a range of innovative and transformative techniques to the women farmers of Sikasso. Today these women are practicing organic farming. They are planting new or reintroduced nutrient-rich crops to feed their families. They are transforming legumes into flour to make infant foods high in nutrient content. Communities are donating arable land to women for community gardens to grow vegetables for families to eat.

In 2019, some communities have even started to plant collective legume fields. Village leaders are requiring households to contribute 3kg to the community-led nutrition demonstrations that benefit everyone. Best of all, villagers report through the joint supervision and inter-village exchange visits, that they value keeping a portion of the harvest to feed their families. Where once the head of household would sell the entire harvest in the market, now with information from their wives who participate in nutrition care groups, these men are learning that by keeping a portion of the harvest for family consumption, their wives and children will be healthier and they will spend less on visits to the health center to treat illnesses.

WHAT IS USAID/PNH?

The USAID-funded *Project Nutrition and Hygiene* (PNH) managed by Save the Children with partner SNV aims to improve the nutritional status of pregnant and lactating women and children under two years of age in six health districts of the Sikasso Region, Mali. It is agriculturally productive, a center for trade, and one of the most densely populated regions of Mali. Over the course of six years, the project aims to reach at least 10,000 pregnant and lactating women (PLW) and 50,000 children under 2 years of age with a full package of interventions.



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